



Report of Survey
OF
French River, Georgian Bay,
Lake Huron,

Made for the Department of Railways and Canals
in 1879

BY

E. P. BENDER, CIVIL ENGINEER.

REPRINTED BY PAYNTER & ABBOTT, OTTAWA.
MARCH, 1900.



1900

(86)

REPORT OF

Survey of French River During 1879,

—BY—

E. P. BENDER.

*To Sanford Fleming, C. M. G., Engineer-in-Chief, Canadian
Pacific Railway :—*

SIR,—I have the honor to submit the following report of survey of French River made last season in accordance with your instructions of May 22nd, 1879.

The harbor of French River, on the north shore of Georgian Bay, was carefully surveyed by Mr. Ridout in 1875. His plans show a channel not less than a quarter of a mile wide, and 30 feet deep. There seems to be an impression among some steamboat captains on the Georgian Bay that the harbor is difficult of access in the fall of the year on account of the prevailing west winds, while others maintain that there is no better harbor on the north shore. These conflicting reports induced me to examine the matter, and I was somewhat surprised to find that stakes placed by Mr. Ridout's party near the waters edge in 1875, were still standing in many places throughout the harbor. It would be hard to find stronger evidence of the excellent shelter which this harbor is capable of affording vessels than the fact that the ice and storms since 1875 have not carried away small stakes placed almost at the water's edge, and retained in position by a few small stones.

French River, from its mouth to its source, in Lake Nipissing, covers a distance of about 50 miles, and is in reality a chain

of very deep lakes separated by narrow bars of rock which dam back the water, thus forming rapids and cascades. These vary in length from 50 to 600 feet. The usual width of the river is from 400 feet to a mile, and the usual depth from 30 to more than 100 feet. The banks are steep, bold and rocky. In the broad expanses between the rapids the shores are indented at short intervals by deep bays, which, not infrequently, extend inland for several miles. Hundreds of islands are scattered throughout its length, and lend a charm to that lonely region.

From the mouth, the course is north-east for a distance of two and a half miles. Here the river, turning suddenly to the east, is crossed by two bars of rock which, by preventing the free passage of the water form the rapids called Les Petites Dalles. These rapids, which have a total fall of 4.16 feet, present more serious difficulties than any other portion of the river. The centre line of the located channel is a reversed curve with a radius of 650 feet, the channel itself being 100 feet wide. The first lock with a lift of 6 feet would be at the foot of these rapids. About six miles from Les Petites Dalles, at the upper end of an expansion of the river, called Lac Le Boeuf, from which there are three large discharges into the Georgian Bay, the channel divides into two branches, one to the left called the South Branch, which extends some 16 miles to Cantin's Bay, the terminus of the late Georgian Bay Branch ; the other, through which nearly the whole volume of water passes, follows the general course of the river to the second rapid, 10 miles from Les Petites Dalles. In this distance there are three narrow passages, each about 125 feet wide, the remainder being from 500 to 1,500 feet in width. A few rocks would have to be removed, and the channel straightened in one or two places. At the second rapid, which has a fall of two feet, and is 362 feet wide, and six feet deep at low water, the second lock is located with a lift of 14 feet. The river is straight, about 500 feet wide, and

30 feet deep, from the second rapid to the Recollet Falls, a distance of five miles. These falls are formed by a bar of rock about 100 feet wide, which obstructs the channel at this point. They are 7.97 feet high. Above the Recollet Falls there is an unbroken stretch of water 18 miles in length, from 400 to 1,500 feet wide, and from 30 to more than 100 feet deep. There are two small discharges from the main channel into the south branch; one branches off three miles from the Recollet, runs south one and a half miles, and falls through a narrow pass into Cantin's Bay, an expansion of the river. The other leaves seven miles from the Recollet, runs south for three and a half miles, and empties into the South Branch through the Horse Shoe Falls. Both these discharges have high banks, and are not more than 20 feet wide, and two feet deep at ordinary low water. Two and a half miles from the Recollet there is a bay which extends north one and a half miles, and receives the discharge of the north branch, which here enters the main channel, after having left it some 20 miles further up. After these 18 miles, there are five rapids in the next five miles. The first of these, Le Parisien, fall 1.27 feet, is little more than a strong current, but since the channel is crooked, considerable excavation would be necessary. Seven thousand feet farther on are Les Petites Faucilles, a number of small currents, with a total fall of 1.63 feet, running in channels separated by islands. The third lock with a lift of 14 feet, is located in a narrow pass, with steep rocky banks, near the head of these currents. The Buisson Rapid, fall 4.65 feet, 3,000 feet from Les Petites Faucilles, is a straight and narrow channel of the required dimensions, with perpendicular banks of rock. At the Double Rapid, fall 3.05 feet, 3,800 feet farther on, the river turns suddenly to the left. The located channel, with a radius of 650 feet, passes through a small water-course to the left of the main channel; for a distance of 400 feet

the work would be rather heavy. Half a mile above this rapid, there is a small current with a fall of 0.26 foot, where the removal of a few rocks would be necessary. The fourth lock is located at La Grande Fauille Rapid, 4,000 feet from the last mentioned current. The fall is here 5.15 feet, and the lift of the lock 14 feet. The Pine Rapid, the last of the five, is 4,000 feet from La Grande Fauille, and has a fall of 2.52 feet. The waterway is of the required dimensions, so that no excavation would be necessary. At the head of the Pine Rapid a beautiful lake meets the eye. To the left, at the bottom of a deep bay, the distant outlet of the north branch can be discerned, which, after a course of 23 miles, empties into the main channel, two and a half miles above the Recollet Falls.

To the right, a short distance from the head of the rapid, there is a branch which re-enters the river below La Grande Fauille. A little further on, the main channel turns to the left while directly opposite the head of the rapid are innumerable islands, densely wooded with lofty pines, thickly scattered in groups and clusters on an area of two miles square. Behind these islands one of the outlets of Lakes Nipissing rushes down a steep incline, and is lost in the still waters below. Following the main channel for eight miles, through groups of islands and broad lakes, we arrive at the Chaudiere Falls.

In this distance the depth is nowhere less than 24 feet, and is usually more than 100 feet; the width varies from 500 feet to three-quarters of a mile. On leaving Kelso's Bay, at the upper end of this lake; 2,000 feet from the Lower Chaudiere Falls, the channel becomes narrow and winding, and it is necessary to leave the river and cut through the narrowest part of a spur of rock, around which the river flows. At the Lower Chaudiere fall, 13.19 feet, the river rushes down between perpendicular banks of rock, scarcely fifty feet apart. In this

narrow pass, the fifth and last lock, with a lift of 14 feet, is located. Between the Lower and Upper Chaudiere there is a basin of 2,000 feet long, with an average width of 500 feet. The Upper Chaudiere, fall 12.96 feet, is a succession of small rapids and deep currents, running in a narrow channel between steep and rocky banks. Although the depth of water is generally sufficient, the channel would have to be widened and straightened in several places.

There is probably no river which presents so many advantages for canalization, as French River, for there are always at least two channels; by damming one the water below the dam would assume a lower level, and works be carried on above which would otherwise have to be done under water; or a lock can be built in a favourable part of the river, and the channel permanently blocked, as proposed at the Chaudiere, Grande Fauille and other rapids, while the whole discharge passes through the other branch. The river might be lighted by placing at each point a red light to the right, and a white light on the left, so that a vessel ascending would pass to the right of the white, and to the left of the red light. In this manner, navigation would be as safe at night as in day. Perhaps it would be found advantageous to have a small steam skiff and two men between each lock to attend to the lights, and thus greatly reduce the number of light-house keepers.

There is no building stone on French River fit for masonry of locks, consequently it would, perhaps, be advisable to construct them of wood and iron in place of stone.

No. 16 is a plan and elevation of one of the proposed locks of 14 feet lift. The sides are wooden frames filled with concrete. The gates are strong and firmly braced iron frames which slide in grooves, and have their up-stream surfaces covered with sheet iron, to prevent the passage of water.

Each gate is raised into position by two or more concentric cylinders, which slide one within the other. That at the head of

the lock is composed of a single frame and two cylinders, one fixed and one moveable. Water is compressed into the stationary cylinder by a pump, worked by a small turbine wheel, and its pressure against the piston-head of the sliding cylinder raises the gate into position. That at the foot of the lock consists of two frames and three cylinders, two moveable and one immoveable. The water, as before, is forced into the fixed one, and its pressure upon the piston-head of the innermost cylinder raises the frame which forms the upper part of the gate until the piston comes into contact with the top of the other sliding cylinder. From this point the two cylinders move together, carrying both frames with them, until the gate is raised into its place. In this way, the gates can be raised and lowered very rapidly, and by one man. Annexed is a table of quantities and structures from Georgian Bay to Lake Nipissing, with their estimated cost.

At the head of the Upper Chaudiere, the level of Lake Nipissing is reached. The first twelve miles of the lake much resembles French River. The least depth in a channel from 500 feet to a mile wide is 22 feet, and for six miles bottom was not reached with 110 feet of line. At 12 miles from the Chaudiere the lake becomes so wide that the opposite shores are scarcely discernable. For the remainder of the distance to the south-east coast, about 18 miles, the existence of a fine straight canal was ascertained, having a minimum depth of 17 feet.

Besides frequent soundings, an apparatus which I have called a Rock Seeker was employed to detect the presence of rocks and shoals. It consists of a horizontal bar 25 feet long firmly held in position, 14 feet below the surface of the water. The apparatus was attached to a boat which was rowed in mid-channel, and consequently any depth less than 14 feet could not remain undiscovered.

No. 18 is a profile of the river and Lake Nipissing. Diagrams showing the temperature for the months of August, September, and October are also given.

The following is a table of distances from Chicago to the sea ports of Montreal and New York by different routes :--

CHICAGO TO NEW YORK.	RAIL MILES	WATER MILES	TOTAL	IN FAV- OUR OF FRENCH RIVER.
Via. Lakes and Erie Canal.....		1419	1419	440
“ Lakes to Buffalo, rail to New York ...	422	925	1347	368
“ All rail.....	961		961	
CHICAGO TO MONTREAL.				
Via. Lakes and St. Lawrence ...		1348	1348	369
“ French River to Lake Nipissing, thence to Montreal by rail.....	354	625	979	

This table shows that French River possesses decided advantages over any of the other routes from Chicago to the seaboard. The returns of the Chicago Board of Trade show that 63,593,687 bushels of wheat and other grains were shipped by the lakes to Buffalo, and thence to New York by railway and canal.

The French River route, being 440 miles shorter than by the Erie Canal, and 368 miles shorter than the combined rail and water route to New York, would certainly attract a large portion of this enormous trade. The forests of pine which border upon Lake Nipissing have as yet scarcely been touched, so that the return trade, which influences the rates of freight, would be very large.

I have the honor to be, Sir,

Your most obedient servant,

E. P. BENDER.